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| 10/566,433 | 01/31/2006 | Daisuke Mukai | 289500004 | 5657 |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/566,433

Applicant(s)

MUKAI ET AL.

Examiner

Jessee Roe

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 6-10, 12, 14 and 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 11, 13 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date 8 July 2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of the Claims

Claims 1-16 are pending wherein claim 1 is amended and claims 6-10, 12, 14 and 16 are withdrawn from consideration.

Status of Previous Rejections

The previous rejection of claims 1-5, 11, 13 and 15 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention is withdrawn in view of the Applicant's amendment to claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5, 11, 13 and 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification does not provide support for the range of a in the formula $\text{MmNi}_a\text{Mn}_b\text{Al}_c\text{Co}_d$ of 4.31 to 4.7 as in amended claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuda et al. (US 6,372,059).

In regards to claim 1, Yasuda et al. ('059) discloses a hydrogen storage alloy having a CaCu_3 structure represented by the formula $\text{MmNi}_a\text{Mn}_b\text{Al}_c\text{Co}_d$ wherein Mm denotes a misch metal, $4.0 \leq a \leq 4.3$, $0.25 \leq b \leq 0.4$, $0.25 \leq c \leq 0.4$, $0.3 \leq d \leq 0.5$, and $5.05 \leq a+b+c+d \leq 5.25$. Although amended claim 1 recites the range $4.31 \leq a \leq 4.7$, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. MPEP 2144.05 I.

With respect to the recitation "wherein the a-axis length of the crystal lattice of said CaCu_3 -type structure is 499 pm or more, and the c-axis length is 405 pm or more." of claim 1, Yasuda et al. ('059) discloses that the a-axis would be usually 500.3 to 501 pm and the c-axis would be between 404.9 and 405.8 pm (col. 3, lines 40-60).

In regards to claim 2, Yasuda et al. ('059) discloses that a, b, c, and d satisfy the relations of $4.0 \leq a \leq 4.3$, $0.25 \leq b \leq 0.4$, $0.25 \leq c \leq 0.4$, $0.3 \leq d \leq 0.5$, and $5.05 \leq a+b+c+d \leq 5.25$ (abstract), which would be close enough to the relationship $5.25 \leq a+b+c+d < 5.30$ to establish a prima facie case of obviousness. MPEP 2144.05 I.

With respect to the recitation "the a-axis length of the crystal lattice is not less than 500.5 pm and not more than 502.7 pm, and the c-axis length is not less than 405.6 pm and not more than 406.9 pm." of claim 2, Yasuda et al. ('059) discloses that the a-axis would be usually 500.3 to 501 pm and the c-axis would be between 404.9 and 405.8 pm (col. 3, lines 40-60).

With respect to the recitation "wherein the pulverization residual rate obtained by the following equation is 50% or more: Pulverization residual rate (%) = (post-cycling particle size/pre-cycling particle size) x 100, when a hydrogen storage alloy is ground and screened to select particles with a particle size in the range of 20 μ m and 53 μ m to provide hydrogen storage alloy powder, and after measuring with a particle size distribution measuring device the average particle size (pre-cycling particle size, D_{50}) of the hydrogen storage alloy powder, 2 g of the hydrogen storage alloy powder is weighed and placed into a PCT holder; the surfaces thereof are cleaned twice under hydrogen pressure of 1.75 MPa; then activation is carried out twice by introducing hydrogen of 3 MPa; next a cycle test using PCT device is repeated 50 times, wherein hydrogen gas of 3 MPa is introduced into 2.0 g of the hydrogen storage alloy powder to absorb hydrogen, and the hydrogen is desorbed at 45°C; and the average particle size of the hydrogen storage alloy powder after the test of the 50 cycles (post-cycling particle size, D_{50}) is measured with a particle size distribution measuring device" of claim 11, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process,

determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. MPEP 2113.

In regards to claims 13 and 15, Yasuda et al. ('059) discloses that the hydrogen storage alloy would be used as the anode material (col. 4, lines 18-24).

Claims 1-5, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko et al. (US 6,261,517).

In regards to claim 1, Kaneko et al. ('517) discloses a rare earth metal-nickel hydrogen storage alloy having a composition represented by the formula $RNi_aMn_bCo_cAl_dX_e$, wherein R stands for one or more rare earth elements including Sc and Y and misch metal may be used as a starting material for industrial production (abstract and col. 4, lines 30-40); X stands for one or more elements selected from the group consisting of Fe, Cu, Zn, V, and Nb (abstract); a, b, c, d, and e satisfy the relations of $3.9 \leq a < 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract); and the alloy would have a $CaCu_5$ structure (abstract), which overlaps the low Co hydrogen storage alloy having a $CaCu_5$ crystal structure and composition represented by the general formula $MmNi_aMn_bAl_cCo_d$, wherein Mm is a Misch metal, $4.31 \leq a \leq 4.7$, $0.3 \leq b \leq 0.65$, $0.2 \leq c \leq 0.5$, $0 < d \leq 0.35$, and $5.2 \leq a+b+c+d \leq 5.5$ of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed hydrogen storage alloy from the hydrogen storage alloy disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) discloses the same utility throughout the disclosed ranges.

With respect to the recitation "wherein the a-axis length of the crystal lattice of said CaCu_5 -type crystal structure is 499 pm or more, and the c-axis length is 405 pm or more." of claim 1, these lattice dimensions would be expected in the structure disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) disclose the same or a substantially similar composition and structure. MPEP 2112.01 I.

In regards to claim 2, Kaneko et al. ('517) discloses that a, b, c, d, and e satisfy the relations of $3.9 \leq a < 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract), which overlaps the compositional limitation of $5.25 \leq a+b+c+d < 5.30$. MPEP 2144.05 I.

With respect to the recitation "the a-axis length of the crystal lattice is not less than 500.5 pm and not more than 502.7 pm, and the c-axis length is not less than 405.6 pm and not more than 406.9 pm." of claim 2, these lattice dimensions would be expected in the structure disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) disclose the same or a substantially similar composition and structure. MPEP 2112.01 I.

In regards to claim 3, Kaneko et al. ('517) discloses that a, b, c, d, and e satisfy the relations of $3.9 \leq a < 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract), which overlaps the compositional limitation of $5.30 \leq a+b+c+d < 5.35$.

With respect to the recitation "the a-axis length of the crystal lattice is not less than 500.0 pm and not more than 502.4 pm, and the c-axis length is not less than 405.9 pm and not more than 407.2 pm." of claim 3, these lattice dimensions would be expected in the structure disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) disclose the same or a substantially similar composition and structure. MPEP 2112.01 I.

In regards to claim 4, Kaneko et al. ('517) discloses that a, b, c, d, and e satisfy the relations of $3.9 \leq a < 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract), which overlaps the compositional limitation of $5.35 \leq a+b+c+d < 5.40$.

With respect to the recitation "the a-axis length of the crystal lattice is not less than 499.8 pm and not more than 502.3 pm, and the c-axis length is not less than 406.0 pm and not more than 407.3 pm." of claim 4, these lattice dimensions would be expected in the structure disclosed by Kaneko et al. ('517) because Kaneko et al. ('517) disclose the same or a substantially similar composition and structure. MPEP 2112.01 I.

In regards to claim 5, Kaneko et al. ('517) discloses that a, b, c, d, and e satisfy the relations of $3.9 \leq a < 6$, $0.45 \leq b < 1.5$, $0.01 \leq c < 0.3$, $0.4 \leq d < 1$, $0 \leq e \leq 0.2$, and $5.2 \leq a+b+c+d+e \leq 7.5$ (abstract), which overlaps the compositional limitation of $5.40 \leq a+b+c+d < 5.45$.

With respect to the recitation "the a-axis length of the crystal lattice is not less than 499.7 pm and not more than 502.3 pm, and the c-axis length is not less than 406.1 pm and not more than 407.4 pm." of claim 5, these lattice dimensions would be expected in the structure disclosed by Kaneko et al. ('517) because Kaneko et al. ('517)

disclose the same or a substantially similar composition and structure. MPEP 2112.01 I.

With respect to the recitation "wherein the pulverization residual rate obtained by the following equation is 50% or more: Pulverization residual rate (%) = (post-cycling particle size/pre-cycling particle size) x 100, when a hydrogen storage alloy is ground and screened to select particles with a particle size in the range of 20 μm and 53 μm to provide hydrogen storage alloy powder, and after measuring with a particle size distribution measuring device the average particle size (pre-cycling particle size, D_{50}) of the hydrogen storage alloy powder, 2 g of the hydrogen storage alloy powder is weighed and placed into a PCT holder; the surfaces thereof are cleaned twice under hydrogen pressure of 1.75 MPa; then activation is carried out twice by introducing hydrogen of 3 MPa; next a cycle test using PCT device is repeated 50 times, wherein hydrogen gas of 3 MPa is introduced into 2.0 g of the hydrogen storage alloy powder to absorb hydrogen, and the hydrogen is desorbed at 45°C; and the average particle size of the hydrogen storage alloy powder after the test of the 50 cycles (post-cycling particle size, D_{50}) is measured with a particle size distribution measuring device" of claim 11, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. MPEP 2113.

In regards to claims 13 and 15, Kaneko et al. ('517) discloses that the hydrogen storage alloy would be used as the anode material (abstract and col. 7, lines 43-51).

Response to Arguments

Applicant's arguments filed 31 October 2008 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that Yasuda ('059) teaches away from the Applicant's claimed invention because Yasuda ('059) discloses "As described above, the ratio of Ni, a, is from 4.0 to 4.3 desirably from 4.1 to 4.2. If a is less than 4.0, the discharge characteristics are not satisfactory. If it exceeds 4.3, deterioration in insusceptibility to grain size reduction or life characteristics is observed" (col. 3, lines 12-16).

In response, the Examiner notes that the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed. MPEP 2123 II. Furthermore, it would have been obvious to one of ordinary skill in the art to exceed 4.3, when changes in grain size would be desired or an optimization of life would not be required. Additionally, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. MPEP 2144.05 I.

Second, the Applicant primarily argues that in the Applicants' specification:

For example, a hydrogen storage alloy can be manufactured by weighing and mixing materials for the hydrogen storage alloy, casting the mixture, and carrying out heat treatment. At this time, the a-axis length and c-axis length of the crystal lattice can be adjusted in a predetermined range by suitably selecting and controlling manufacturing conditions, such as casting conditions (casting method, casting temperature, cooling rate, etc.) and heat-treatment conditions, according to the alloy composition. In general, the c-axis length of the crystal lattice can be increased by increasing the cooling rate in casting, and the c-axis length of the crystal lattice can also be increase by raising the heat-treatment temperature. However, since the c-axis length of the crystal lattice in some alloy species is increase even if the heat-treatment temperature is low, these must be suitably controlled according to the alloy species.

The Applicant further argues that specific heat and cooling conditions are used to achieve Applicant's claimed a-axis length and c-axis length of the crystal lattice. Thus, the a-axis and c-axis lengths of the crystal lattice are not merely inherent properties of the crystal composition and structure and these lengths are key to achieve the applicant's superior hydrogen storage alloy.

In response, the Examiner notes that Yasuda ('059) (col. 2, lines 39-50) and Kaneko et al. ('517) disclose casting the same or a substantially similar composition. Therefore, the a-axis length and the c-axis length would be expected and the Applicant has failed to provide evidence to the contrary. MPEP 2112.01 I and MPEP 2145.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John P. Sheehan/
Primary Examiner, Art Unit 1793

JR